



# Greenhouse Gas Planning Rule TRAC

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**COLORADO**

Department of Transportation



On December 16, 2021 the Transportation Commission of Colorado approved a groundbreaking new rule that will reduce pollution and greenhouse gas emissions from the transportation sector, improve air quality and reduce smog, and provide more travel options for Coloradans.







# Where Did the Idea for This Rule Come From?

## 2019 - State Legislature passed HB19-1261, "Climate Action Plan to Reduce Pollution"

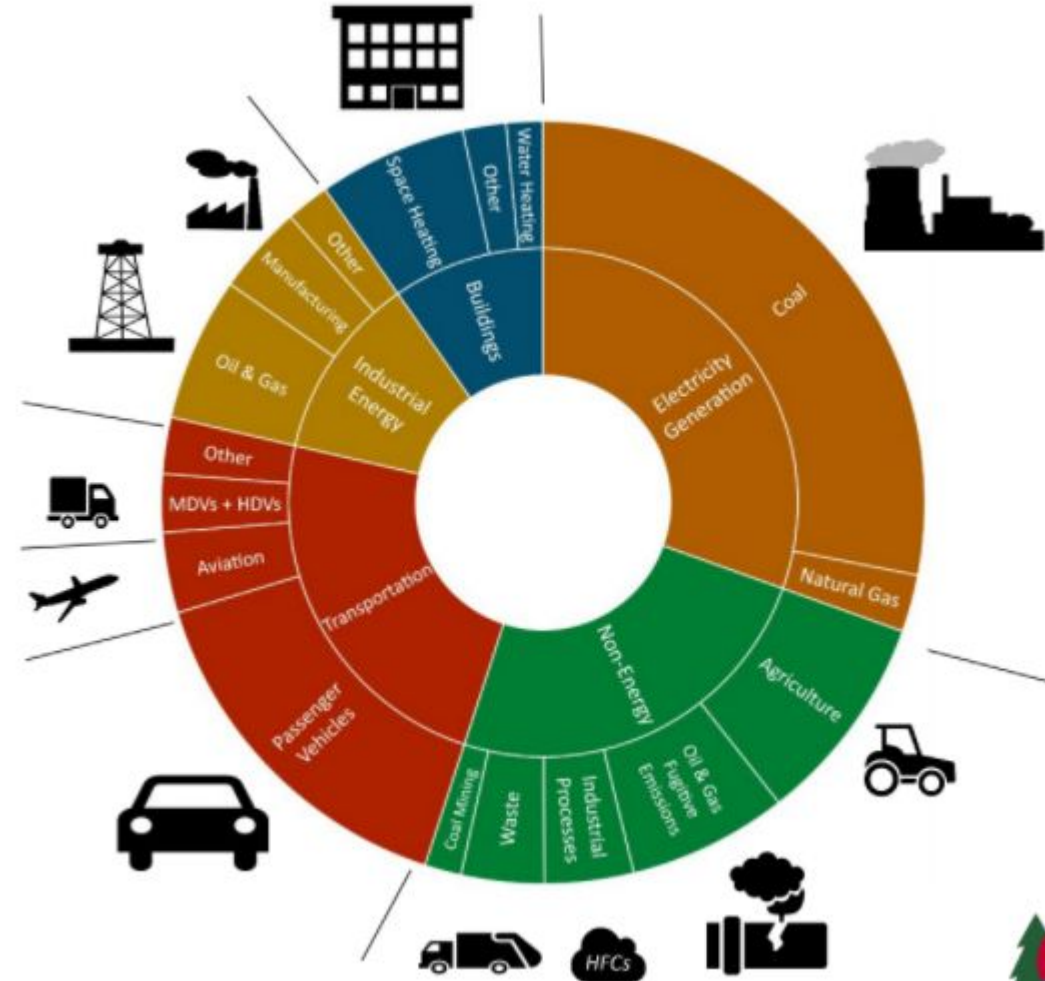
- Reduce GHG emissions 26% by 2025, 50% by 2030, and 90% by 2050

## Colorado Greenhouse Gas Roadmap

- Transportation is the greatest source of emissions in Colorado
- Create a GHG standard for transportation planning

## Senate Bill 21-260

- Made the Roadmap recommendation for transportation planning a requirement.

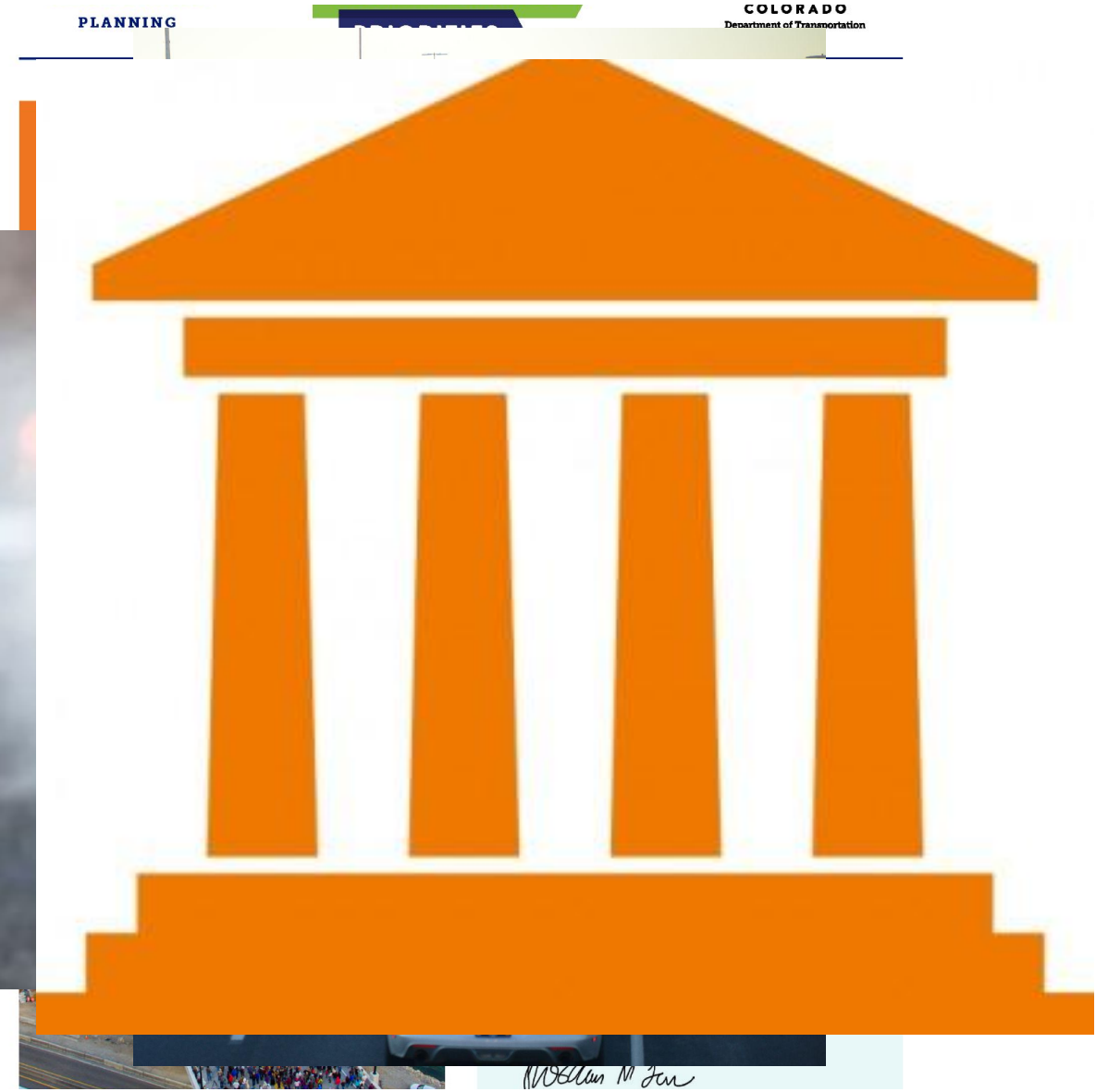




# Background for Understanding this Rule

This proposed standard focuses on:

- ✓ Transportation Planning
- ✓ Greenhouse gas emissions
- ✓ Government agencies and regional planning organizations
- ✓ Passenger Cars (not trucks or ai





# *What is Required?*

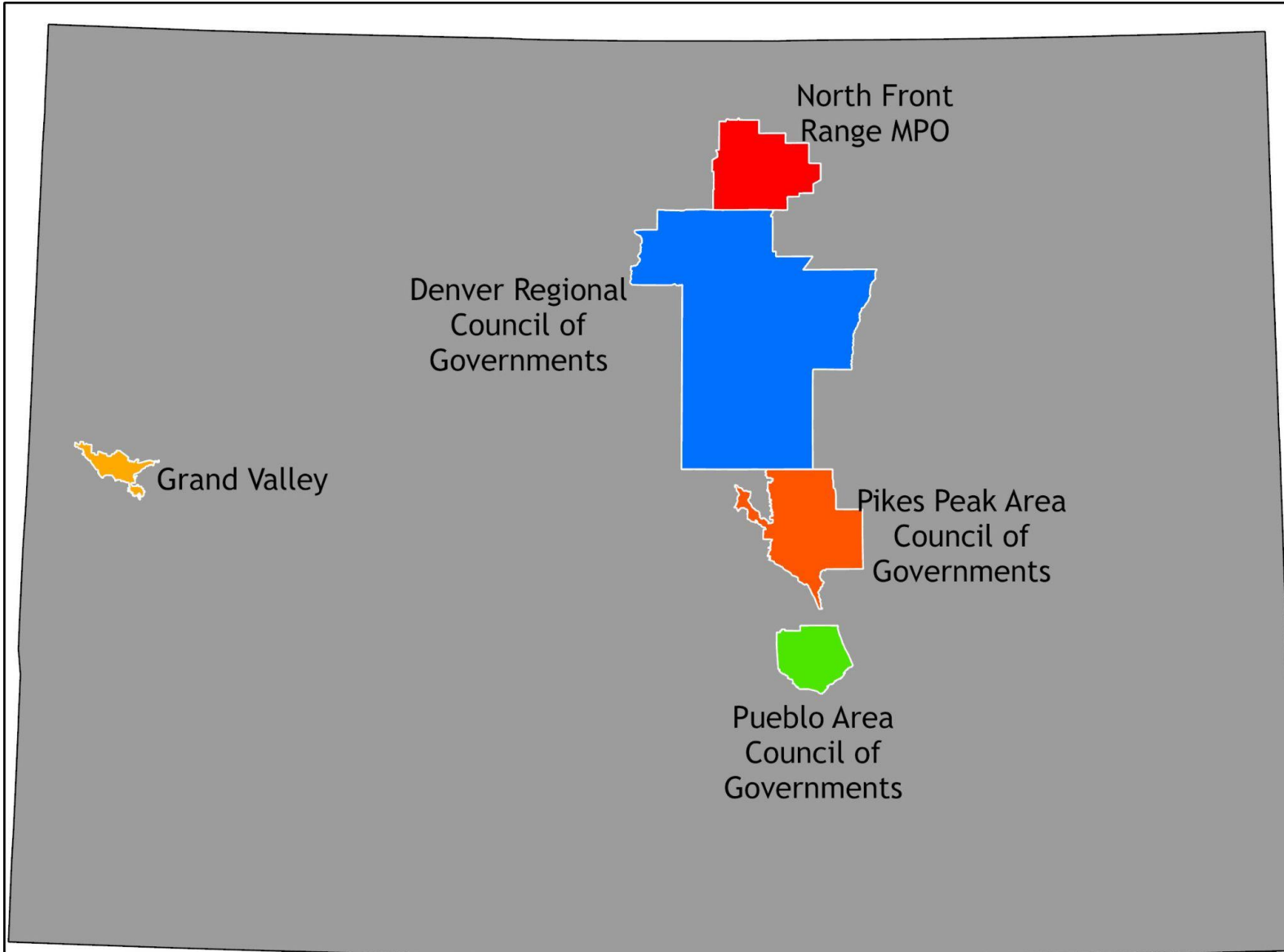
CDOT and each metropolitan planning organization must adopt long-range transportation plans that reduce GHGs to set reduction levels.

Each plan (e.g. an MPO's regional transportation plan (RTP)) must be modeled--using travel demand models--to make this determination.

Specific GHG reduction level set for each of four compliance years and for each agency (CDOT + Colorado's 5 MPOs).



# Colorado's Planning Agencies



- Denver Regional Council of Governments (DRCOG)
- Grand Valley MPO (GVMPO)
- North Front Range MPO (NFRMPO)
- Pikes Peak Area Council of Governments (PPACG)
- Pueblo Area Council of Governments (PACOG)



# *By how much will CDOT and the MPOs need to reduce GHG emissions?*

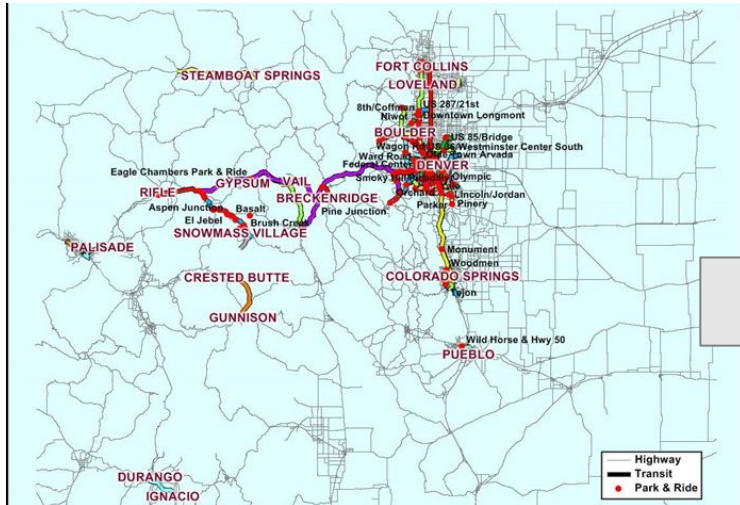
**Table 1: GHG Transportation Planning Reduction Levels in MMT of CO<sub>2</sub>e**

Regional Areas	2025 Reduction Level (MMT)	2030 Reduction Level (MMT)	2040 Reduction Level (MMT)	2050 Reduction Level (MMT)
DRCOG	0.27	0.82	0.63	0.37
NFRMPO	0.04	0.12	0.11	0.07
PPACG	N/A	0.15	0.12	0.07
GVMPO	N/A	0.02	0.02	0.01
PACOG	N/A	0.03	0.02	0.01
CDOT/Non-MPO	0.12	0.36	0.30	0.17
<b>TOTAL</b>	<b>0.43</b>	<b>1.5</b>	<b>1.2</b>	<b>0.7</b>

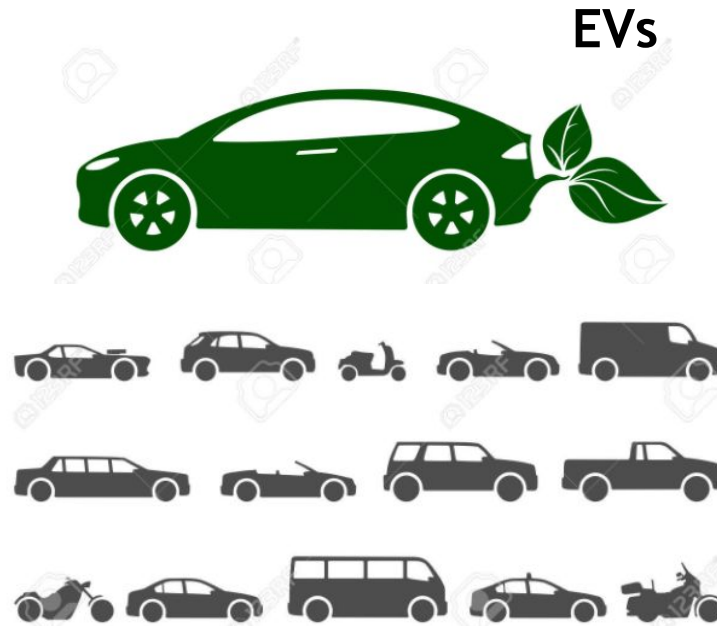


# How Are Emissions Calculated?

## CDOT TRAVEL MODEL



## EPA MOVES MODEL



TOGETHER  
these models show

TRANSPORTATION  
GHG  
EMISSIONS

Outputs: VMT,  
congestion/speed

Fleet Mix/Age & Fuel Type

Baseline = existing transportation plan.

Compliance = updated plan.





# GHG Mitigations

- GHG mitigation strategies are a key concept within the GHG Rule providing another pathway toward meeting the GHG reduction levels in the Rule.
- GHG Mitigation Measures are those that can't be effectively modeled YET or are too small to be captured.
- The Transportation Commission adopted this as Policy Directive 1610.0.



# Mitigation Categories - and some examples

## Bike/Ped

- Build new bike lanes and sidewalks
- “Complete Streets” reconstruction

## Transit

- New/expanded bus service
- Reduce transit fares

## MD/HD Electrification

- Rebates/incentives for depot charging

## Travel Demand Management

- Telework
- Commute Trip Reduction programs

## Operations

- Retime/optimize arterial signals
- Roundabouts

## Parking Management

- Additional fee on parking
- Unbundle residential parking

## Land Use

- Increase residential density
- Increase job density



# How Transit is depicted in the model

## A few different ways

- In the travel model itself
- Added on to the travel model (EERPAT)
- As a GHG Mitigation Measure (off model analysis)



# Transit in PD1610 - Table 1

Transit							
New/increased fixed-route transit service <sup>9</sup> -electric	Per 1,000 additional vehicle revenue-hours <sup>10</sup> in evaluation year	1	31	25	15	7	
New/increased fixed-route transit service -electric/diesel fleet average			10	20	15	7	

<sup>8</sup> Reconstruct streets to include or enhance bicycle and pedestrian facilities as well as transit priority treatments if appropriate.

<sup>9</sup> Some new transit projects may yield higher GHG reductions if the agency supplies local specific data. CDOT and the MPOs may use the “Transit GHG Mitigation Measure User Input Tool” found on the CDOT GHG webpage as an alternative to the points in this table when evaluating the GHG reductions impact of new or expanded transit services.

<sup>10</sup> Expressing service expansion in vehicle-hours captures a wide range of specific actions including adding route-miles, reducing headways, and extending





# Transit in PD1610 - Table 1

Project Type	Metric	Project Lifetime (Years) <sup>1</sup>	Points/Metric <sup>2</sup> <u>Now-2025<sup>3</sup></u>	Points/Metric 2026-2030	Points/Metric 2031-2040	Points/Metric 2041-2050	Additional Multipliers
New/increased fixed-route transit service - intercity <sup>11</sup> fleet average bus	Per 1,000 vehicle revenue-miles	1	2	2	1	1	
New/increased fixed-route transit service - intercity electric bus			3	3	1	1	
Waive transit fares 25%	Per million annual trips current ridership base		69	57	33	16	
Waive transit fares 50%			139	115	67	32	
Waive transit fares 100%			277	229	133	63	
Implement bus priority treatments <sup>12</sup>	Per 1,000 vehicle revenue-miles per weekday of affected service in evaluation year	30	37	26	13	6	

service hours or days. Ridership elasticities are available to relate to overall service metrics, but will be less available for more specific actions. Data to support ridership response to other improvements (e.g., bus stops and other amenities) will be less available.

<sup>11</sup> Intercity transit services that cross multiple regional and metropolitan areas, e.g. CDOT's Bustang. Intercity buses have a more efficient driving cycle due to use of the highway.

<sup>12</sup> Infrastructure and/or operational improvements to reduce run times and improve reliability. These may include transit signal priority, queue jump lanes, exclusive bus lanes, bulb-outs, and/or other treatments. Bus priority treatments will need to meet minimum standards, e.g., anticipated >+10% travel time reduction on high-frequency (<=20 min headway) routes.



# Transit in PD1610 - Table 1

Project Type	Metric	Project Lifetime (Years) <sup>1</sup>	Points/Metric <sup>2</sup> <u>Now-2025<sup>3</sup></u>	Points/Metric 2026-2030	Points/Metric 2031-2040	Points/Metric 2041-2050	Additional Multipliers
New/increased demand-response bus service	Per 1,000 new vehicle revenue hours	1	1	6	5	2	



# Transit in PD1610

Table 3 -  
Specific calculation methodology  
User input

User-input method for new transit service				
Planned new annual vehicle revenue-miles				Agency service plan
Anticipated new ridership (annual unlinked trips)				Agency estimate based on survey, model, or similar service
Anticipated share of new riders who previously drove or used a taxi/TNC				Agency estimate based on rider surveys or local mode shares. Use 60% if no local data available.
Average unlinked trip length of new riders (mi)				Agency estimate based on rider surveys, models, or data. Use 4.52 if no local data available.
Transit vehicle size				Agency service plan
Transit vehicle technology				Agency service plan
Average load factor for new	-	-	-	= new riders * trip length / new revenue-miles

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The complete PD can be found here:  
<https://www.codot.gov/programs/environmental/greenhousegas/assets/pd-1610-0-greenhouse-gas-mitigation-measures-june2022.pdf>

Subject	Number
GHG Mitigation Measures Policy Directive	1610.0

service				
Change in annual auto VMT				= new riders * trip length * prior drive mode share
Change in annual tons CO2				
Displaced auto	-	-	-	= change in auto VMT * C3 / 1000000
New bus service	-	-	-	= 1000 * C1 * A1 * / 1000000
Net change	-	-	-	= new bus + displaced auto
Points	-	-	-	





Questions?